PUNJABI UNIVERSITY, PATIALA

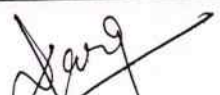## OUTLINES OF TESTS,

SYLLABI AND COURSES OF READING

FOR

B.Sc. (Computer Science, Statistics, Mathematics) Part -II

2021-2022

PUNJABI UNIVERSITY PATIALA

PUNJABI UNIVERSITY, PATIALA

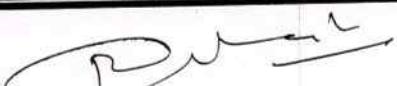# SYLLABUS
B.Sc. (Computer Science, Statistics ,Mathematics) Part – II
Outlines of Tests Syllabi and Courses of Reading.
Note:-Every theory paper will be of three hours duration.
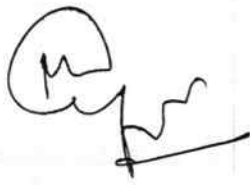**For Examination of Session 2021-22**

3rd Semester

Code	Core/ Elective	Title of paper /subject	Hrs./ Week	Max. Marks		Total	Total Credits
				Cont. Asmt.	Uni. Exam.		
CSM 231	Core	Advanced Calculus	4	30	45	75	4
CSM 232	Core	Differential Equations	4	30	45	75	4
CSM 233	Core	Applied Statistics	3	20	30	50	3
CSM 234	Core	Statistical Inference I	3	20	30	50	3
CSM 235	Core	Statistical Practicals-III	4	-	50	50	2
CSM 236	Elective	Oracle	3	20	30	50	3
CSM 237	Elective	Data Base Management System	3	20	30	50	3
CSM 238	Elective	Computer Practicals- III	4	-	50	50	2
			Total	140	310	450	24

Note:1. The minimum pass marks in each paper is 35% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.

2. In addition to above mentioned subjects, there will be a course of Environmental and Road Safety Awareness as a qualifying subject
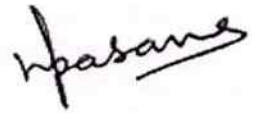
BREAK-UP OF CONTINUOUS ASSESSMENT MARKS
IN THEORY PAPERS

1.	Two tests will be held and their average will be considered for assessment.	50% Marks
2.	Seminars/Assignments/Quizes/ Class participation	25% Marks
3.	Attendance	25% Marks

Marks will be given according to below criteria:

75% attendance & above but less than 80%	60% Marks of allotted marks to attendance
80% attendance & above but less than 85%	80% Marks of allotted marks to attendance
85% attendance& above	100% Marks of allotted marks to attendance

CSM 231: ADVANCED CALCULUS

No. of Lectures : 55
to be delivered

Max. Marks : Uni. Examination – 45 } 75
Int. Assessment – 30

Time Allowed : 3 Hours

Min. Pass : Uni. Examination – 35% } 40% Aggregate
Int. Assessment – 35%

Marks

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

Section A

The language of sets and functions - countable and uncountable sets. Real numbers - least upper bounds and greatest lower bounds.

Sequences:- limit points of a sequence, convergent sequences; bounded and monotone sequences, the limit superior and limit inferior of a sequence. Cauchy sequences and the completeness of R.

Infinite Series of non-negative terms:-convergence and divergence of series, absolute and conditional convergence. Various tests for convergence of series. Connection between infinite series and decimal expansions, binary expansions of real numbers.

Section-B

Alternating series:- Leibnitz's theorem, absolute and conditional convergence.

Series of arbitrary terms: convergence, divergence and oscillation. Abel's and Dirichlet's tests.

Calculus of a single variable: Continuity; attainment of supremum and infimum of a continuous function on a closed bounded interval, uniform continuity. Differentiability of functions. Rolle's theorem and mean value theorems. Higher derivatives, maxima and minima.Taylor's theorem - various forms of remainder, infinite Taylor expansions.

TEXT BOOKS

1. T. M. Apostol: Mathematical Analysis. Nasora Publishing House, New-Delhi,1985.
2. T. M. Apostol: Calculus, Nasora Publishing House, New-Delhi
3. S. Dineen: Multivariate Calculus and Geometry, Springer Undergraduate Mathematics Series 3rd ed. 2014
4. R. R. Goldberg: Methods of Real Analysis, 2nd ed., Wiley, 1976
5. T. Tao: Analysis I. Hindustan Book Agency, 2006

REFERENCE READINGS

1. Robert G. Bartle, Donald R. Sherbert: Introduction to Real Analysis.4th ed. Wiley 2011
2. H. Royden: Real Analysis. Macmillan, 1968
3. S.C. Malik & S. Arora: Mathematical Analysis New Age Science,2009

CSM 232 : DIFFERENTIAL EQUATIONS

No. of Lectures : 55 to be delivered	Max. Marks :	Uni. Examination — 45 } 75 Int. Assessment — 30	
Time Allowed : 3 Hours	Min. Pass Marks :	Uni. Examination — 35% } 40% Aggregate Int. Assessment — 35%	

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Series solutions of differential equations. Power series method. Bessel, Legendre and Hypergeometric equations. Bessel, Legendre and Hypergeometric functions and their properties. Convergence, recurrence and generating relations. Orthogonality of functions. Sturm-Liouville problem. Orthogonality of eigen-functions. Reality of eigen values. Orthogonality of Bessel functions and Legendre polynomials.

Partial differential equations of the first order. Lagrange's solution. Some special types of equations which can be solved easily by methods other than the general method. Charpit's general method of solution.

SECTION-B

Partial differential equations of second and higher orders. Classification of linear partial differential equations of second order. Homogeneous and non-homogeneous equations with constant coefficients. Partial differential equations reducible to equations with constant coefficients. Monge's methods.

Laplace Transforms — Linearity of the transformation. Existence theorem for Laplace transforms. Laplace transforms of derivatives and integrals. Shifting theorems. Differentiation and integration of transforms. Convolution theorem. Solution of integral equations and systems of differential equations using the Laplace transformation.

TEXT BOOKS

1. Richard Bronson(2004): Theory and Problems of Differential Equations, McGraw-Hill, (India).
2. Zafar Ahsan (2016): Introduction to Differential Equations(2nd edition), PHI.

REFERENCE READINGS

1. Erwin Kreyszig(2020): Advanced Engg. Mathematics, John Wiley & Sons Inc.,10th Ed., New York.
2. D. A. Murray (2017): Introductory Course on Differential Equations, Creative Media Partners. 2017.
3. Ian N Sneddon (2013): Elements of Partial Differential Equations, Dover, New York.
4. Rao, K. S.(2010):Introduction to Partial Differential Equations. India: PHI.
5. Ricardo, H. J. (2020): A Modern Introduction to Differential Equations. Netherlands: Elsevier Science.

CSM 233: APPLIED STATISTICS

No. of Lectures : 40
to be delivered

Time Allowed : 3 Hours

Max. Marks : Uni. Examination — 30 } 50
Int. Assessment — 20 }

Min. Pass : Uni. Examination — 35% } 40% Aggregate
Marks : Int. Assessment — 35% }

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Time Series: Definition, components of a time series, measurement of secular trend by graphical method, method of semi averages, method of moving averages, fitting of Mathematical curves using Legendre's least square method, measurement of seasonal fluctuations by using methods of ratio-to-moving average, ratio to trend and link relatives, measurement of cyclical fluctuations(excluding periodogram analysis).

SECTION-B

Index Numbers: Definitions, interpretation and applications of index numbers. Problems involved in the construction of index numbers, Laspeyre's, Paasche's, Marshal-Edgeworth, Fisher's, Drobish-Bowley , Kelly's formulae for index numbers. Criterion of good index numbers, Errors in index numbers, uses of index numbers. Cost of living index numbers and its uses.

Demand Analysis: Theory and analysis of consumer's demand: Law of demand, Price elasticity of demand, Estimation of demand curves; Forms of demand functions, Engel's curves, Income elasticity of demand.

TEXT BOOKS

1. Gun, A.M.; Gupta, M.K. ,Dasgupta, B,(2008), Fundamentals of Statistics, Vol. II, ed. 9th , World Press,and Calcutta
2. Gupta, S. C. and Kapoor, V. K. (2019): Fundamentals of Applied Statistics, 4th Edition, Sultan Chand & Sons

REFERENCE READINGS

1. Croxton, F. E. & Cowden, D. J. (1967) : Applied General Statistics, Prentice Hall Inc ., Englewood Cliffs, N. J. – 3rd Edition
2. Mukhopadhyay, P. P (2011): Applied Statistics, Books and Allied pvt. Ltd., 2nd Edition
3. Mukhopadhyay, P. (1999): Applied Statistics. New Central Book Agency Pvt. Ltd.

CSM 234 : STATISTICAL INFERENCE - I

No. of Lectures : 40
to be delivered

Max. Marks : Uni. Examination − 30 ⎫ 50
Int. Assessment − 20 ⎭

Time Allowed : 3 Hours

Min. Pass Marks : Uni. Examination − 35% ⎫ 40% Aggregate
Int. Assessment − 35% ⎭

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

Section-A

Introduction: Parametric models, parameters; random sample and its likelihood; statistic and its sampling distribution; problems of inference.

Data Reduction: Sufficiency, Factorization Theorem (proof of discrete case only), Illustrations, Concept of Minimal Sufficiency.

Point Estimation: Properties of estimators: Unbiasedness and Minimum Variance Unbiased Estimator (MVUE). Consistency of estimators and sufficient conditions for consistency. Relative efficiency of an estimator.

Interval Estimation: Concepts of Confidence Interval and Confidence Coefficient. Confidence Intervals for the Parameters of univariate normal, two independent normal.

Section-B

Methods of Estimation: Method of Moments, Method of maximum likelihood. Statement of properties of MLE.
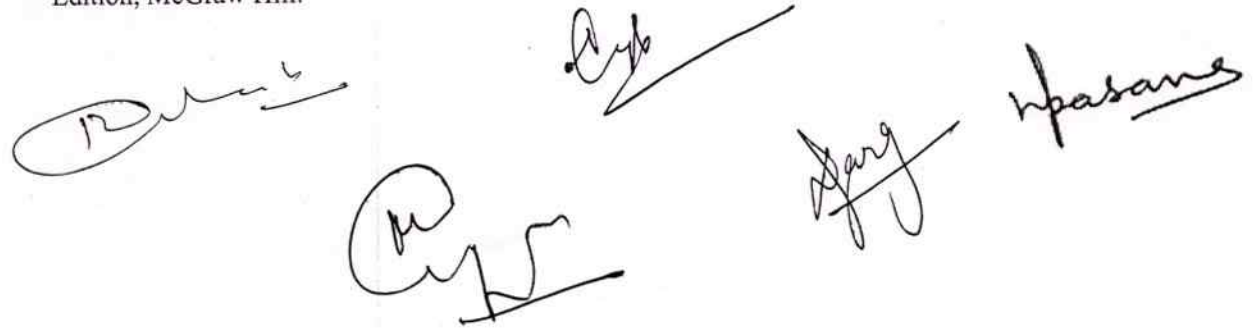
Testing of Hypotheses: Statistical Hypotheses- Simple and Composite. Statistical tests, Critical region, Errors of Type I and Type II, Size and Power of a test. Definition of Most Powerful (MP),Uniformly Most Powerful (UMP), Unbiased and Uniformly Most Powerful Unbiased (UMPU) tests. Neyman Pearson Lemma and its application in testing hypotheses regarding binomial, Poisson, normal and exponential distributions.

TEXT BOOKS

1. Bhattacharya G.K and Johnson R.A.(1977): Statistical Concepts and Methods. John Wiley and Sons.
2. Dudewicz E.J and Mishra S.N.(1988): Modern Mathematical Statistics, International Student Edition, John Wiley and Sons.
3. Freund J.E.(2000): Mathematical Statistics, Prentice - Hall of India.
4. Gun, A. M., Gupta, M. K., & Dasgupta, B. (2013). An outline of statistical theory(Vol 2). World Press Pvt Limited.

REFERENCE READINGS

1. Hogg R.V and Craig A.T.(2019): Introduction to Mathematical Statistics, Pearsons.
2. Mood A.M., Graybill F.A and Boes D.C.(1974): Introduction to the Theory of Statistics, Third Edition, McGraw Hill.

CSM-235: STATISTICAL PRACTICALS-III

Total Practical Sessions: 25   Max. Marks : Uni. Examination: 50
(each of two hours)
Time Allowed   : 3 Hours   Min. Pass :   40%
                                       Marks

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.
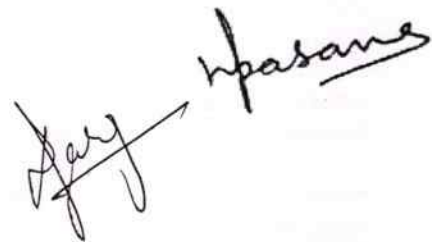
The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Exercises	:	30

Lab Course:

The exercises will be based on the syllabus of the papers CSM-233(Applied Statistics) and CSM – 234 (Statistical Inference- I)

CSM-236: ORACLE

No. of Lectures : 40 to be delivered	Max. Marks:	Uni. Examination – 30 Int. Assessment – 20 } 50	
Time Allowed : 3 Hours	Min. Pass : Marks	Uni. Examination – 35% Int. Assessment – 35% } 40% Aggregate	

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each whereas section C will carry 14 marks.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each whereas section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed.

SECTION - A

Interactive SQL : SQL commands; Data Definition Language Commands; Data Manipulation Language Commands; The Data types a cell can hold; insertion of data into the table; Viewing of data into the tables; Deletion operations; Updating of contents of the table; Modifying the structure of the table; Renaming the table; Destroying tables; Data Constraints; Types of data constraints; Column Level Constraints; Table Level Constraints; Null value Concepts; The UNIQUE Constraint; The PRIMARY constraints; The FOREIGN key constraint; The CHECK Constraint; Viewing the User Constraints, User access rights.

Viewing The Data: Computations on Table Data; Arithmetic Operators; Logical Operators; Comparison Operators; Range Searching; Pattern Searching; ORACLE FUNCTIONS; Number Functions; Group Functions; Scalar Functions; Data Conversion Functions; Manipulating Dates in SQL; Character Functions;

Sub Queries and Joins: Joins; Equi Joins; Non Equi Joins; Self Joins; Outer Joins; Sub Queries; Correlated Queries; Using Set Operators:- Union , Intersect ; Minus;

Views and Indexes: Definition and Advantages Views; Creating and Alternating Views; Using Views; Indexed Views; Partitioned Views; Definition and Advantages of Indexes; Composite Index and Unique Indexes; Accessing Data with and without Indexes; Creating Indexes and Statistics.

SECTION – B

Introduction to PL/SQL : Advantage of PL/SQL; The Generic PL/SQL Block; The Declaration Section; The Begin Section; The End Section; The Character Set; Literals; PL/SQL Data types; Variables; Constants; Logical Comparison; Conditional Control in PL/SQL; Iterative Control;

Advanced PL/SQL: Types of Cursors; Implicit Cursor; Explicit Cursor; Explicit Cursor attributes; Cursor for Loop; Parameterized Cursor; Error Handling in PL/SQL; Internal Exceptions; User Defined Exceptions.

Database Objects: Sequences, Creating Sequences; Referencing Sequences; altering a Sequence; Dropping a Sequence; Synonyms, Creating Synonyms, Dropping Synonyms. Stored Procedures and Functions:- Advantages of using a Procedure or Function; Procedure Versus Function; Creating stored Procedures and Functions; Parameters to Procedures and Functions; Deleting a stored Procedure or Function; Packages:- Components of a Package; Package Objects; Private and Public; Package state; Package Dependency; Triggers:- Use of Database Triggers; Database Triggers v/s Procedures; Database Triggers v/s Integrity Constraints; RAISE_APPLICATION_ERROR PROCEDURE; Types of Triggers:- Row Triggers, Statement Triggers; Before v/s After Triggers; Deleting a Trigger.

Object Types and Varrying Arrays: User Defined Data Types, Creating a Type, Varrying Array, Creating and Using Varrying array, Nested Tables.

TEXT BOOKS:

1. Plew R. and Stephens R.."SAMS Teach yourself SQL in 21 days", 4th edition (2002): Techmedia Publication
2. Byross I. "PL/SQL The Programming Language of ORACLE" 4th edition (2020): BPB Publication
3. Palinski J.A. "Oracle : PL/SQL Handbook" (2003) Pearson Publication

CSM 237 : DATABASE MANAGEMENT SYSTEM

No. of Lectures : 40   Max. Marks : Uni. Examination – 30 ⎱ 50
to be delivered   Int. Assessment   – 20 ⎰

Time Allowed : 3 Hours   Min. Pass : Uni. Examination – 35% ⎱ 40% Aggregate
                          Marks   Int. Assessment   – 35% ⎰

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

SECTION A

Traditional file processing system : Characteristics, limitations, Database : Definition, composition.
Database Management system : Definition, Characteristics, advantages over traditional file processing system, User of database, DBA and its responsibilities, Database schema, instance.
DBMS architecture, data independence, mapping between different levels.
Database languages : DDL, DML, DCL.
Database Keys : Super, candidate, primary, unique, foreign.
Entity relationship model : concepts, mapping cardinalities, entity relationship diagram, weak entity sets, strong entity set, aggregation, generalization, converting ER diagrams to tables.
Overview of Network and Hierarchical model.
Relational Data model : concepts, constraints. Relational algebra : Basic operations, additional operations.

SECTION B

Database design : Functional dependency, decomposition, problems arising out of bad database design, normalization, multi-valued dependency. Database protection, database integrity, database concurrency : Problems arising out of concurrency, methods of handling concurrency. Data recovery, database security : Authentication, authorization, methods of implementing security.
MS-ACCESS : Introduction to MS-ACCESS, working with databases and tables, queries in Access, Applying integrity constraints, Introduction to forms, sorting and filtering, controls, Reports and Macro : creating reports, using Macros.

TEXT BOOK:

1. C.J. Date, "An Introduction to Data Base Systems", 8th Ed.,2003, Addison Wesley,
2. C. J. Date, "An Introduction to Data Base Systems" 3rd Edition, Narosa Publishers, 1997. (Reprint).
3. Bipin Desai, "An Introduction to DBMS"11th edition , West Group, 1990
4. Elmasri R. and Navathe B. S.,"DBMS",6th edition, Pearson,2011

REFERENCE READINGS

1. Jeffrey D. Ullman, "Principles of Database Systems", 2nd Edition., Galgotia Publications, 1984.
2. D. Kroenke., "Database Processing", Galgotia Publications, 1987.
3. Henry F. Korth, "Database System Concepts", McGraw Hill. Inc., 1997.
4. Naveen Prakash, "Introduction to Database Management", TMH, 1993.

CSM 238 : COMPUTER PRACTICALS-III

Total Practical Sessions: 25   Max. Marks : Uni. Examination: 50
(each of two hours)
Time Allowed   : 3 Hours   Min. Pass :   40%
                                        Marks

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Development of programmes :		30
& their execution		

Lab Course:

The exercises will be based on the syllabus of the papers CSM 236 (Oracle) and CSM 237 (Data Base Management System).

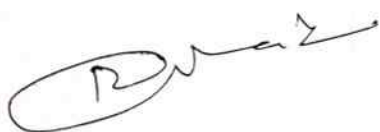## Syllabus

4 th Semester
For Examination of Session 2021-22

Code	Core/ Elective	Title of paper /subject	Hrs./ Week	Max. Marks		Total	Total Credits
				Cont. Asmt.	Uni. Exam.		
CSM 241	Core	Real Analysis	4	30	45	75	4
CSM 242	Core	Topics in Analysis	4	30	45	75	4
CSM 243	Core	Industrial Statistics	3	20	30	50	3
CSM 244	Core	Statistical Inference II	3	20	30	50	3
CSM 245	Core	Statistical Practicals-IV	4	-	50	50	2
CSM 246	Elective	Operating Systems	3	20	30	50	3
CSM 247	Elective	ASP.NET	3	20	30	50	3
CSM 248	Elective	Computer Practicals- IV	4	-	50	50	2
			Total	140	310	450	24

Note   The minimum pass marks in each paper is 35% in Continuous Assessment and University Examination separately subject to a minimum of 40% in aggregate.

BREAK-UP OF CONTINUOUS ASSESSMENT MARKS
IN THEORY PAPERS

1.	Two tests will be held and their average will be considered for assessment.	50% Marks
2.	Seminars/Assignments/Quizes/ Class participation	25% Marks
3.	Attendance	25% Marks

Marks will be given according to below criteria:

75% attendance & above but less than 80%	60% Marks of allotted marks to attendance
80% attendance & above but less than 85%	80% Marks of allotted marks to attendance
85% attendance& above	100% Marks of allotted marks to attendance

CSM-241: REAL ANALYSIS

No. of Lectures : 55
to be delivered

Max. Marks :
Uni. Examination − 45
Int. Assessment − 30 } 75

Time Allowed : 3 Hours

Min. Pass : Marks
Uni. Examination − 35%
Int. Assessment − 35% } 40% Aggregate

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Riemann integral, Integrability of continuous and monotonic functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus.

Improper integrals and their convergence, Comparison tests, Able's and Dirichlet's tests, Frullani's integral, Integral as a function of a parameter, Continuity, derivability and integrability of an integral function of a parameter.

SECTION-B

Limit and continuity of functions of two variables, Partial derivation and differentiability of real-valued functions of two variables. Schwarz's and Young's theorems, Statements of inverse function theorem, implicit function theorem and their applications. Euler's theorem on homogeneous functions, Taylor's theorem , Jacobians, maxima, minima and saddle points of functions of two variables. Lagrange's multiplier method.

Fourier series: Fourier expansion of piecewise monotonic functions.

TEXT BOOKS

1. Malik, S. C., Arora, S. (2017). Mathematical Analysis. India: New Age International.
2. Garling, D. J. H. (2013). A Course in Mathematical Analysis, Vol.1, Cambridge University Press.

REFERENCE READINGS

1. Zorich, V. A. (2016). Mathematical Analysis I. Germany: Springer Berlin Heidelberg.
2. Magnus, R. (2020). Fundamental Mathematical Analysis. Germany: Springer International Publishing.
3. Pugh, C. C. (2013). Real Mathematical Analysis. Springer, New York.

CSM-242: TOPICS IN ANALYSIS

No. of Lectures : 55
to be delivered

Time Allowed : 3 Hours

Max. Marks :
Uni. Examination — 45
Int. Assessment — 30 } 75

Min. Pass :
Marks
Uni. Examination — 35%
Int. Assessment — 35% } 40% Aggregate

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 6 marks each where as section C will carry 21 marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Beta and Gamma functions, Double and triple integrals, Change of order of integration in double integals.

Vector Analysis: Product of two vectors, Scalar and vector product of three vectors, Vector differention. Gradient, divergence and curl. Vector integration. Statements (without proof) of Gauss, Green and Stokes theorems and their applications.

SECTION-B

Sequences and series of functions, pointwise and uniform convergence, Cauchy's criterion for uniform convergence, Weierstrass M-test, Abel's and Dirichlet's tests for uniform convergence ,uniform convergence and and continuity, uniform convergence and Riemann integration, uniform convergence and differentiation, Weierstrass approximation theorem. Power series, uniquincess theorem for power series.
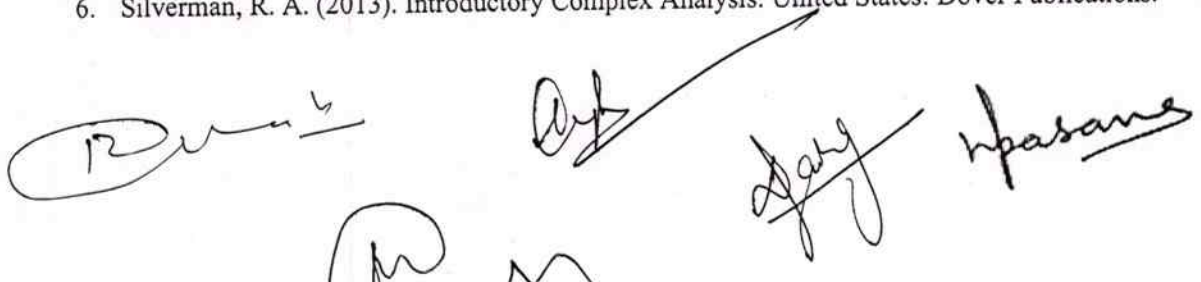
Complex analysis:

Complex numbers as ordered pairs. Geometric representation of complex numbers, Stereographic projection.

Continuity and differentiability of complex functions. Analytic functions. Cauchy'-Riemann Equations. Harmonic functions.

Analytic functions as conformal mapping. Examples of mapping by elementary functions. Mobius Transformations. Fixed points. Crossratio. Inverse points.

TEXT BOOKS

1. Malik, S. C., Arora, S. (2017). Mathematical Analysis. India: New Age International.
2. Pathak, H. K. (2019). Complex Analysis and Applications. Germany: Springer Singapore.
3. Garling, D. J. H. (2013). A Course in Mathematical Analysis, Vol.1, Cambridge University Press.
4. Zorich, V. A. (2016). Mathematical Analysis I. Germany: Springer Berlin Heidelberg.
5. Magnus, R. (2020). Fundamental Mathematical Analysis. Germany: Springer International Publishing.
6. Silverman, R. A. (2013). Introductory Complex Analysis. United States: Dover Publications.

CSM - 243 : INDUSTRIAL STATISTICS

No. of Lectures : 40
to be delivered

Time Allowed : 3 Hours

Max. Marks : Uni. Examination − 30 } 50
Int. Assessment − 20 }

Min. Pass : Uni. Examination − 35% } 40% Aggregate
Marks Int. Assessment − 35% }

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Statistical quality control: Definition, chance and assignable causes, process and product control, the technique of control charts for process control, three sigma control limits and specification limits. Schewhart control charts for mean, standard deviation and range, control charts for number defectives and fraction defective, control chart for number of defects.

Advantages of process control, sampling inspection by attributes, the concept of producer's and consumer's risks, AOQ, AOQL, ASN and OC functions and curves, single and double sampling plans.

SECTION - B

Inventory problem: Introduction, definition, inventory costs, inventory variables. Classification of inventory problems, Concept of Economic Ordering Quantity (EOQ), EOQ problems without/with shortages, Uniform/Constant demand, Finite/infinite replenishment of inventory. EOQ problems with price breaks.

TEXT BOOKS

1. Gun, A.M.; Gupta, M.K. ,Dasgupta, B, Fundamentals of Statistics, Vol. II, ed. 9th , World Press,and Calcutta -2008

2. Kanti Swarup, P.K. Gupta and Manmohan : Operations Research, Sultan Chand and Sons, New Delhi, Edition - 2014

3. S.C. Gupta and V.K. Kapoor Fundamentals of Applied Statistics, 4th Edition, Sultan Chand & Sons, 2019

CSM - 244 : STATISTICAL INFERENCE – II

No. of Lectures : 40
to be delivered

Time Allowed : 3 Hours

Max. Marks : Uni. Examination – 30 } 50
Int. Assessment – 20

Min. Pass : Uni. Examination – 35% } 40% Aggregate
Marks   Int. Assessment – 35%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

Section – A

Sampling distributions: Chi-square, t and F. Distribution of the sample mean and variance of independent random observations from a normal population.

Tests about the mean and variance of a univariate normal distribution, comparison of two univariate normal distributions through their means and variances. Testing the significance of the correlation coefficient and the regression coefficients in the case of simple regression.

Section – B

Exact tests and confidence intervals; Tests relating to Binomial and Poisson distributions. A test for independence of two attributes.

Large sample tests: Use of CLT for deriving large sample tests for binomial proportion, difference of two binomial proportions, mean of a population and difference of means of two independent populations. Related confidence intervals. Pearsonian Chi-square tests for independence of attributes, homogeneity of populations and goodness of fit.

Fisher's Z-transformation of the sample correlation, test regarding the population correlation coefficient based on Z-transformation and confidence limits for the coefficient based on it.

TEXT BOOKS

1. Gun, A.M.; Gupta, M.K. ,Dasgupta, B (2008) : Fundamentals and Statistics, Vol. 1, World Press Pvt. Ltd., Calcutta
2. Gun, A.M.; Gupta, M.K. ,Dasgupta, B.(2013): An outline of Statistical Theory, Vol.2, The World Press Publishers Private Limited, Calcutta.
3. Freund J.E.(2000): Mathematical Statistics, Prentice - Hall of India.

REFERENCE BOOKS

1. Bhattacharya G.K and Johnson R.A.(1977): Statistical Concepts and Methods. John Wiley and Sons.
2. Dudewicz E.J and Mishra S.N.(1988): Modern Mathematical Statistics, International Student Edition, John Wiley and Sons.
3. Tanis, E., Zimmerman, D. L., Hogg, R. V., Hogg, R. (2019). Probability and Statistical Inference. United Kingdom: Pearson.
4. Mood A.M., Graybill F.A and Boes D.C.(1974): Introduction to the Theory of Statistics, Third Edition, McGraw Hill.

CSM-245: STATISTICAL PRACTICALS-IV

Total Practical Sessions: 25
(each of two hours)
Time Allowed : 3 Hours

Max. Marks : Uni. Examination: 50

Min. Pass : 40%
Marks

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.
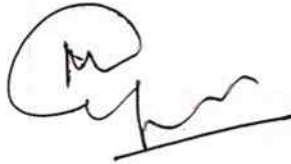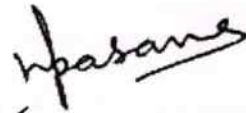
The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Exercises	:	30

Lab Course:

The exercises will be based on the syllabus of the papers CSM-243 (Industrial Statistics) and CSM-244 (Statistical Inference II).

CSM - 246 : OPERATING SYSTEMS

No. of Lectures : 40
to be delivered

Max. Marks : Uni. Examination — 30 } 50
Int. Assessment — 20

Time Allowed : 3 Hours

Min. Pass Marks : Uni. Examination — 35% } 40% Aggregate
Int. Assessment — 35%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

SECTION-A

Introduction to operating System, its need and Operating system services, Definition, Early systems, Simple batch systems, Multiprogrammed batched systems, Time sharing systems, Personal computer systems and Real time systems. Process Management.

CPU Scheduling: Basic concepts, Scheduling criteria, Scheduling algorithms : FCFS, SJF, Round Robin & Queue Algorithms. Deadlocks: Deadlock characterisation, Methods for handling deadlocks, Banker's Algorithm.

SECTION-B

Memory Management: Logical versus Physical address space, Swapping, Contiguous allocation, Paging, Segmentation.

Virtual Memory: Demand paging, Performance of demand paging, Page replacement, Page replacement algorithms, Thrashing.

File management: File system Structure, Allocation methods: Contiguous allocation, Linked allocation, Indexed allocation, Free space management: Bit vector, Linked list, Grouping, Counting.

Device Management: Disk structure, Disk scheduling: FCFS, SSTF, SCAN, C-SCAN, LOOK, Selecting disk scheduling algorithm.

TEXT BOOKS

1. Abraham Silberschatz, Peter B. Galvin, " Operating System Concepts", Wiley 10th. Ed., 2018.
2. Ekta Walia: "Operating Systems", 2nd edition, Khanna Book Publishers. 2019

REFERENCE READINGS

1 Brinch Hansen, "Operating System Principles", Prentice-Hall, 1984.
3. N. Haberman, "Introduction to Operating System Design", Galgotia Publication, 1986.
4. Brich Hansen, "The Architecture of Concurrent Programs", PHI, 1978.

CSM – 247 : ASP.NET

No. of Lectures : 40
to be delivered

Time Allowed : 3 Hours

Max. Marks : Uni. Examination – 30 } 50
Int. Assessment – 20

Min. Pass : Uni. Examination – 35% } 40% Aggregate
Marks Int. Assessment – 35%

INSTRUCTIONS FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C. Each of sections A and B will have four questions from the respective sections of the syllabus and section C will consist of one compulsory question having seven parts of short-answer type covering the entire syllabus uniformly. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt five questions in all, selecting two questions from each section A and B and the compulsory question of section C. All questions of sections A and B will carry 4 marks each where as section C will carry 14 marks.

Use of scientific non-programmable calculator is allowed

Section A

Introduction of Microsoft ASP.NET,. Net Framework, An overview of NET including the Common Language Interface, the Common Type System, the Common Language Runtime, and NET Framework and class libraries Language and platform neutrality.

An introduction to Web Forms. The ASP.NET execution model.

ASP NET Web Application User Interface : Creating an ASP.NET Web application user interface. Implementing event handles by using code-behind files, Explain user input by using validation controls, Create and use user controls, Server-side controls, events.

Managing State: The Various Means to Manage State, Request object, Application object, Cache object, Session object, Server-side state management, Using session for server-side and client-side state management.

XML Web Services: Need of XML Web services, Understanding the Web Service Model, Creating an ASP, NET Web Service, Creating & Consuming Web Services with Visual Studio. NET Creating Web Services, Discovering Web Services, Instantiating and Invoking Web Services, Creating Web reference proxy for an XML Web Service. Consuming web services in both Windows Forms and Web apps.

Section B

Master Page ,Creating a User Interface Using Controls, Validating Data, Navigating Between Forms Implementing Navigation for the User Interface : Round Trip and Post back, State Management for user navigation Navigation between Pages.

Storing and Retrieving Data with ADO.NET: ADO, NET Overview, Connecting to Data, Executing SQL with Commands, Accessing Data with ADO,NET; Fast Data Access with Data Readers, Data Set Basics, Filling DataSets with DataAdaters, Using Data sent on Web Forms. Processing Transactions Data Binding : Bind Data to the UI, Transform and Filter Data.

Security : Authentication and Authorizing Users, Windows Authentication, Using Forms Authentication

TEXT BOOKS

1. Matthew MacDonald: ASP.NET: The Complete Reference, Osborne.

REFERENCE READINGS

1. Jesse Liberty, Dan Hurwitz: Programming ASP.NET.OReilly.
2. Stephen Walther: ASP.NET 3.5 Unleashed, SAMS.
3. Infosys Campus Connect Foundation Program Volume: 1-3, Education & Research Department, Infosys Technologies Ltd. Bangalore.

CSM-248 : COMPUTER PRACTICALS-IV + PROJECT

Total Practical Sessions: 25
(each of two hours)
Time Allowed : 3 Hours

Max. Marks : Uni. Examination: 50

Min. Pass : 40%
Marks

INSTRUCTION FOR THE PAPER SETTER AND THE CANDIDATES

The setting and evaluation will be done by a board of examiners consisting of Head, External examiner and the teacher(s) involved with the teaching of this paper.

The practical paper will consist of four exercises and the candidates will be required to attempt any three exercises.

The break-up of marks for the University Examination will be as under:

Lab. Record	:	10
Viva-voce	:	10
Development of programmes & their execution	:	21
Project	:	9

Lab Course:

The exercises will be based on the syllabus of the papers CSM – 247(ASP.NET)